

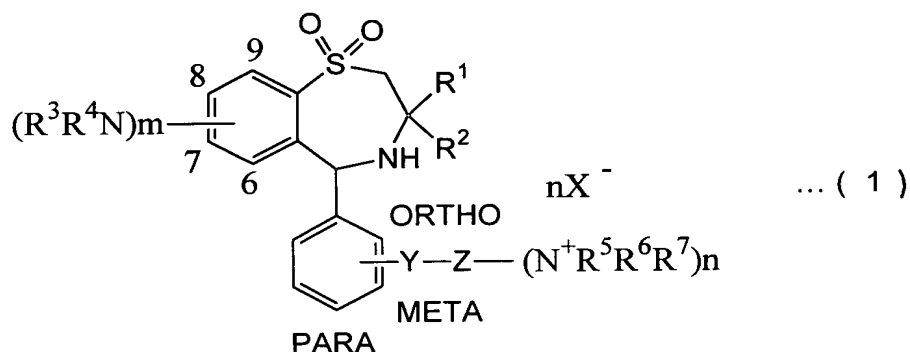
AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-30. (canceled)

31. (new) A compound represented by formula (1) below



wherein  $R^1$  and  $R^2$ , which may be mutually different, each represents an alkyl group having from 1 to 10 carbon atoms;

$m$  represents an integer of 1 or 2, and  $R^3$  and  $R^4$ , which may be mutually different, each represents an alkyl group having from 1 to 5 carbon atoms;

$Y$  represents any one of  $-NHCS-$ ,  $-NHCSNH-$ , and  $-NHCSO-$  where the  $-NH$  in the  $-NHCS-$  represents a bond which links with an adjacent benzene ring and the  $CS-$  in the  $-NHCS-$  represents a bond which links with an adjacent  $Z$ , and the  $-NH$  in the  $-NHCSO-$  represents a bond which links with an adjacent benzene ring and the  $CSO-$  in the  $-NHCSO-$  represents a bond which links with an adjacent  $Z$ ;

Z- ( $N^+R^5R^6R^7$ )<sub>n</sub> represents an alkyl group having from 2 to 10 carbon atoms or an alkenyl group having from 2 to 10 carbon atoms which is substituted with n ( $-N^+R^5R^6R^7$ )s, where at least one of methylenes which constitute Z may be replaced by any one of a phenylene and an -O-; n is an integer of 1 or 2; and  $N^+R^5R^6R^7$  is any one of I), II), and III) given below which are mutually independent

I)  $R^5$ ,  $R^6$ , and  $R^7$ , which may be mutually different, each represents any one of an alkyl group having from 1 to 10 carbon atoms, an alkenyl group having from 2 to 10 carbon atoms, and an alkynyl group having from 2 to 10 carbon atoms, where the alkyl group, the alkenyl group, and the alkynyl group may be substituted with at least one of a phenyl group, a naphthyl group, a pyridyl group, a quinolyl group, a thienyl group, a furyl group, a piperidyl group, a pyrrolidyl group, a morpholyl group, a cycloalkyl group having from 3 to 7 carbon atoms, a cyano group, a nitro group, a hydroxyl group, an oxo group, a thioxo group, a carboxyl group, a  $-CONH_2$  group, an  $-SO_3H$  group, and further, at least one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group may be replaced by any one of a phenylene, a thienylene, a furylene, a cyclohexylene, a cyclopentylene, an -O-, an -S-, a  $-CO_2-$ , an  $-NHCO-$ , an  $-NR^8-$ , and an  $-N^+W^-R^9R^{10}-$  where  $R^8$  represents an alkyl group having from 1 to 5 carbon atoms or an alkenyl group having from 2 to 5 carbon atoms and the alkyl group and alkenyl group

represented by  $R^8$  may be substituted with at least one of a phenyl group, a cycloalkyl group having from 3 to 7 carbon atoms, and a hydroxyl group;  $R^9$  and  $R^{10}$ , which may be mutually different, each represents an alkyl group having from 1 to 5 carbon atoms or alkenyl group having from 2 to 5 carbon atoms and may be substituted with at least one of a phenyl group, a cycloalkyl group having from 3 to 7 carbon atoms, and a hydroxyl group; and  $W^-$  represents a counter anion,

II)  $N^+R^5R^6R^7$  represents a monocyclic ring or a bicyclic ring which is formed by 4 to 9 carbon atoms in addition to an ammonium nitrogen atom, provided that the position of its bonding with Z is the ammonium nitrogen atom, where one of the carbon atoms which constitute the ring in the monocyclic ring and the bicyclic ring may be replaced by any one atom of oxygen, nitrogen, and sulfur, and moreover, the monocyclic ring and the bicyclic ring may be substituted with at least one of a hydroxyl group, an oxo group, a thioxo group, a cyano group, a phenyl group, a naphthyl group, a thienyl group, a pyridyl group, a cycloalkyl group having from 3 to 7 carbon atoms, a carboxyl group, a  $-CONH_2$  group, an  $-SO_3H$  group, and an  $-R^{11}$  group;  $R^{11}$  represents an alkyl group having from 1 to 8 carbon atoms or an alkenyl group having from 2 to 8 carbon atoms, where the alkyl group and the alkenyl group represented by  $R^{11}$  may be substituted with at least one of a phenyl group, a naphthyl group, a pyridyl group, a quinolyl group, a thienyl group, a furyl group, a piperidyl group, a

pyrrolidyl group, a morpholyl group, a cycloalkyl group having from 3 to 7 carbon atoms, a cyano group, a nitro group, a hydroxyl group, an oxo group, a thioxo group, a carboxyl group, a  $-\text{CONH}_2$  group, and an  $-\text{SO}_3\text{H}$  group; moreover, at least one of methylenes which constitute the alkyl group and the alkenyl group may be replaced by any one of a phenylene, a thienylene, a furylene, a cyclohexylene, a cyclopentylene, an  $-\text{O}-$ , an  $-\text{S}-$ , a  $-\text{CO}_2-$ , an  $-\text{NHCO}-$ , an  $-\text{NR}^8-$ , and an  $-\text{N}^+\text{W}^-\text{R}^9\text{R}^{10}-$ , where  $\text{R}^8$ ,  $\text{R}^9$ ,  $\text{R}^{10}$ , and  $\text{W}^-$  are as described above; among  $\text{R}^5$ ,  $\text{R}^6$ , and  $\text{R}^7$ , a group which is not involved in formation of the monocyclic ring and the bicyclic ring is the same as that in I) described above,

III)  $\text{N}^+\text{R}^5\text{R}^6\text{R}^7$  represents a pyridinium ring, a quinolinium ring, or an isoquinolinium ring, provided that the position of its bonding with Z is an ammonium nitrogen atom; the pyridinium ring, the quinolinium ring, and the isoquinolinium ring may be substituted with at least one of a cyano group, a nitro group, a phenyl group, a naphthyl group, a thienyl group, a pyridyl group, a cycloalkyl group having from 3 to 7 carbon atoms, an alkoxy group having from 1 to 5 carbon atoms, a carboxyl group, a  $-\text{CONH}_2$  group, an  $-\text{SO}_3\text{H}$  group, and an  $-\text{R}^{12}$  group;  $\text{R}^{12}$  represents an alkyl group having from 1 to 9 carbon atoms or an alkenyl group having from 2 to 9 carbon atoms; and the alkyl group and the alkenyl group represented by  $\text{R}^{12}$  may be substituted with at least one of a phenyl group, a naphthyl group, a pyridyl group, a quinolyl group, a thienyl group, a furyl group, a cycloalkyl group having

from 3 to 7 carbon atoms, a cyano group, a nitro group, a hydroxyl group, an oxo group, a thioxo group, a carboxyl group, a  $-\text{CONH}_2$  group, and an  $-\text{SO}_3\text{H}$  group; and further, at least one of methylenes which constitute the alkyl group and the alkenyl group may be replaced by any one of a phenylene, a thienylene, a furylene, a cyclohexylene, a cyclopentylene, an  $-\text{S}-$ , a  $-\text{CO}_2-$ , an  $-\text{NHCO}-$ , an  $-\text{NR}^8-$ , and an  $-\text{N}^+\text{W}^-\text{R}^9\text{R}^{10}-$ , where  $\text{R}^8$ ,  $\text{R}^9$ ,  $\text{R}^{10}$ , and  $\text{W}^-$  are as described above, and

$\text{X}^-$  represents a counter anion.

32. (new) The compound according to claim 31, wherein the  $\text{Z}-(\text{N}^+\text{R}^5\text{R}^6\text{R}^7)_n$  represents an alkyl group having from 2 to 10 carbon atoms which is substituted with  $n$   $(-\text{N}^+\text{R}^5\text{R}^6\text{R}^7)$ s and at least one of methylenes which constitute  $\text{Z}$  may be replaced by any one of a phenylene and an  $-\text{O}-$ .

33. (new) The compound according to claim 32, wherein the  $\text{Z}-(\text{N}^+\text{R}^5\text{R}^6\text{R}^7)_n$  represents a straight chain alkyl group having from 2 to 10 carbon atoms which is substituted with one  $-\text{N}^+\text{R}^5\text{R}^6\text{R}^7$  and at least one of methylenes which constitute  $\text{Z}$  may be replaced by any one of a phenylene and an  $-\text{O}-$ .

34. (new) The compound according to claim 33, wherein the  $\text{Z}-(\text{N}^+\text{R}^5\text{R}^6\text{R}^7)_n$  represents a straight chain alkyl group having from 2 to 10 carbon atoms which is substituted with one  $-\text{N}^+\text{R}^5\text{R}^6\text{R}^7$ , a straight chain alkyl group having from 2 to 10 carbon atoms which is substituted with one  $-\text{N}^+\text{R}^5\text{R}^6\text{R}^7$  and one of methylenes which constitute  $\text{Z}$  is replaced by a phenylene, a straight chain

alkyl group having from 2 to 10 carbon atoms which is substituted with one  $-N^+R^5R^6R^7$  and one of methylenes which constitute Z is replaced by an -O-, or a straight chain alkyl group having from 2 to 10 carbon atoms which is substituted with one  $-N^+R^5R^6R^7$  and one of methylenes which constitute Z is replaced by a phenylene and another of methylenes which constitute Z is replaced by an -O-.

35. (new) The compound according to claim 34, wherein Z represents a straight chain methylene group having from 2 to 10 carbon atoms, a straight chain methylene group having from 2 to 10 carbon atoms of which one methylene is replaced by a phenylene, a straight chain methylene group having from 2 to 10 carbon atoms of which one methylene is replaced by an -O-, or a straight chain methylene group having from 2 to 10 carbon atoms of which one methylene is replaced by a phenylene and another methylene is replaced by an -O-.

36. (new) The compound according to claim 35, wherein Z represents a straight chain methylene group having from 2 to 10 carbon atoms.

37. (new) The compound according to claim 35, wherein Y represents -NHCS- or -NHCSNH- at the para- or meta-position.

38. (new) The compound according to claim 36, wherein Y represents -NHCS- or -NHCSNH- at the para- or meta-position.

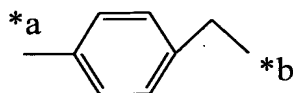
39. (new) The compound according to claim 38, wherein Y represents -NHCSNH- at the meta-position; and Z represents a straight chain methylene group having from 2 to 10 carbon atoms.

40. (new) The compound according to claim 38, wherein Y represents -NHCS- at the meta-position; and Z represents a straight chain methylene group having from 2 to 10 carbon atoms.

41. (new) The compound according to claim 40, wherein Y represents -NHCS- at the meta-position; and Z represents a straight chain methylene group having 5 carbon atoms.

42. (new) The compound according to claim 35, wherein Y represents -NHCSNH- at the meta-position; and Z represents a straight chain methylene group having from 2 to 10 carbon atoms of which one methylene is replaced by a phenylene.

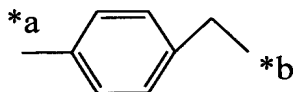
43. (new) The compound according to claim 37, wherein Y represents -NHCS- or -NHCSNH- at the meta-position; and Z is represented by formula (sp-14)



(sp-14)

wherein \*a is bonded to Y in the formula (1) and \*b is bonded to  $N^+R^5R^6R^7$ .

44. (new) The compound according to claim 42, wherein Y represents -NHCSNH- at the meta-position; and Z is represented by formula (sp-14)



(sp-14)

wherein \*a is bonded to Y in the formula (1) and \*b is bonded to  $N^+R^5R^6R^7$ .

45. (new) The compound according to claim 31, wherein  $N^+R^5R^6R^7$  is any one of I), II), and III) given below which are mutually independent:

I)  $R^5$ ,  $R^6$ , and  $R^7$ , which may be mutually different, each represents any one of an alkyl group having from 1 to 10 carbon atoms, an alkenyl group having from 3 to 8 carbon atoms, and an alkynyl group having from 3 to 9 carbon atoms, where the alkyl group, the alkenyl group, and the alkynyl group may be substituted with at least one of a phenyl group, a thienyl group, a cyclohexyl group, a cyano group, a hydroxyl group, an oxo group, a carboxyl group, a  $-CONH_2$  group, and an  $-SO_3H$  group, and further, at least one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group may be replaced by any one of a phenylene, a thienylene, a furylene, an  $-O-$ , a  $-CO_2-$ , an  $-NHCO-$ , an  $-NR^8-$ , and an  $-N^+W^-R^9R^{10}-$  where  $R^8$  represents an alkyl group having from 1 to 3 carbon atoms or an alkenyl group having 3 carbon atoms and the alkyl group may be substituted with at least one of a phenyl group and a hydroxyl group;  $R^9$  and  $R^{10}$ , which may be mutually different, each represents an alkyl group having from 1 to 3 carbon atoms or an



alkenyl group having 3 carbon atoms and the alkyl group may be substituted with at least one of a phenyl group and a hydroxyl group,

II)  $N^+R^5R^6R^7$  represents a monocyclic ring or a bicyclic ring which is any one of a pyrrolidinium ring, a piperidinium ring, a morpholinium ring, a thiomorpholinium ring, a piperazinium ring, an azepanium ring, a quinuclidinium ring, and a 1,4-diazabicyclo[2.2.2]octanium ring, provided that the position of its bonding with Z is an ammonium nitrogen atom; the monocyclic ring and the bicyclic ring may be substituted with at least one of a hydroxyl group, an oxo group, a cyano group, a phenyl group, a  $-CONH_2$  group, and an  $-R^{11}$  group;  $R^{11}$  represents an alkyl group having from 1 to 6 carbon atoms or an alkenyl group having 3 carbon atoms, where the alkyl group represented by  $R^{11}$  may be substituted with at least one of a hydroxyl group, a cyano group, a phenyl group, and a  $-CONH_2$  group; moreover, at least one of methylenes which constitute the alkyl group may be replaced by any one of an  $-O-$ , a  $-CO_2-$ , and an  $-NHCO-$ ; among  $R^5$ ,  $R^6$ , and  $R^7$ , a group which is not involved in formation of the ring represents an alkyl group having 1 to 6 carbon atoms, an alkenyl group having 3 to 4 carbon atoms, or an alkynyl group having 3 to 6 carbon atoms; the alkyl group, the alkenyl group, and the alkynyl group represented by  $R^5$ ,  $R^6$ , or  $R^7$  may be substituted with at least one of a phenyl group, a thienyl group, a furyl group, a piperidyl group, a pyrrolidyl group, a morpholyl group, a

cyclopropyl group, a cyclopentyl group, a cyano group, a hydroxyl group, an oxo group, a nitro group, a carboxyl group, an  $-\text{CONH}_2$  group, and an  $-\text{SO}_3\text{H}$  group; and moreover, at least one of methylenes which constitute the alkyl group may be replaced by any one of a phenylene, an  $-\text{O}-$ , and a  $-\text{CO}_2-$ ,

III)  $\text{N}^+\text{R}^5\text{R}^6\text{R}^7$  represents a pyridinium ring, a quinolinium ring, or an isoquinolinium ring, provided that the position of its bonding with Z is an ammonium nitrogen atom; the pyridinium ring and the quinolinium ring may be substituted with at least one of a cyano group, a nitro group, a phenyl group, a thienyl group, a pyridyl group, an alkoxy group having from 1 to 3 carbon atoms, a carboxyl group, a  $-\text{CONH}_2$  group, and an  $-\text{R}^{12}$  group;  $\text{R}^{12}$  represents an alkyl group having from 1 to 9 carbon atoms or an alkenyl group having from 2 to 4 carbon atoms; and the alkyl group and the alkenyl group represented by  $\text{R}^{12}$  may be substituted with at least one of a phenyl group, a naphthyl group, a pyridyl group, a cyano group, a nitro group, a hydroxyl group, an oxo group, a carboxyl group, and an  $-\text{SO}_3\text{H}$  group; and further, at least one of methylenes which constitute the alkyl group and the alkenyl group may be replaced by any one of an  $-\text{S}-$ , a  $-\text{CO}_2-$ , an  $-\text{NHCO}-$ , and an  $-\text{NR}^8-$  where  $\text{R}^8$  represents an alkyl group having 1 to 3 carbon atoms and the alkyl group may be substituted with at least one hydroxyl group.

46. (new) The compound according to claim 31, wherein  $\text{N}^+\text{R}^5\text{R}^6\text{R}^7$  is any one of I), II), and III) given below which are

mutually independent:

I)  $R^5$ ,  $R^6$ , and  $R^7$ , which may be mutually different, each represents a straight chain alkyl group having from 1 to 10 carbon atoms, a straight chain alkenyl group having from 3 to 6, or 8 carbon atoms, a branched alkenyl group having 4, 6, or 7 carbon atoms, a straight chain alkynyl group having from 3, 5, 6, 7, or 9 carbon atoms, or a branched alkynyl group having 6 carbon atoms, in which 1) the alkyl group, alkenyl group, and alkynyl group represented by  $R^5$ ,  $R^6$ , and  $R^7$  are substituted with any one of a phenyl group, a thienyl group, a cyclohexyl group, a cyano group, a hydroxyl group, an oxo group, a carboxyl group, a  $-CONH_2$  group, and an  $-SO_3H$  group, 2) the alkyl group, the alkenyl group, and the alkynyl group are substituted with two hydroxyl groups, 3) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one hydroxyl group and one  $-SO_3H$  group, 4) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one oxo group and one phenyl group, 5) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one hydroxyl group and two phenyl groups, 6) one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by any one of a phenylene, a furylene, a  $-CO_2-$ , an  $-NHCO-$ , an  $-NR^8-$  (where  $R^8$  represents a methyl group, an ethyl group, an n-propyl group, a 2-propenyl group, a 2-hydroxyethyl group, a 2-hydroxypropyl group, or a benzyl group), and an  $-N^+W^-R^9R^{10}-$  (where  $R^9$  and  $R^{10}$  each represents

a methyl group, an ethyl group, an n-propyl group, a 2-propenyl group, a 2-hydroxyethyl group, or a benzyl group), 7) two of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group are replaced by any one selected from two (-O-)s, one phenylene and one -O-, one -O- and one -NR<sup>8</sup>-, and one -NHCO- and one -O-, 8) three of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group are replaced by any one selected from two (-O-)s and one -NR<sup>8</sup>-, or one phenylene and two (-NHCO-)s, 9) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one hydroxyl group, and moreover, one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by an -O-, 10) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one hydroxyl group, and moreover, one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by an -NR<sup>8</sup>-, 11) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one hydroxyl group, and moreover one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by a furylene, 12) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one oxo group, and moreover, one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by a thienylene, or 13) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one oxo

group, and moreover, two of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group are replaced by one -O- and one phenylene, or the alkyl group, alkenyl group, and alkynyl group are neither substituted nor replaced,

II)  $N^+R^5R^6R^7$  represents a monocyclic ring or a bicyclic ring which is any one of a pyrrolidinium ring, a piperidinium ring, a morpholinium ring, a thiomorpholinium ring, a piperazinium ring, an azepanium ring, a quinuclidinium ring, and a 1,4-diazabicyclo[2.2.2]octanium ring, provided that the position of its bonding with Z is an ammonium nitrogen atom; the monocyclic ring and the bicyclic ring are 1) substituted with any one of a hydroxyl group, an oxo group, a cyano group, a phenyl group, a -CONH<sub>2</sub> group, and an -R<sup>11</sup> group, 2) substituted with one cyano group and one hydroxyl group, 3) substituted with one hydroxyl group and one -R<sup>11</sup>, 4) substituted with one oxo group and one -R<sup>11</sup>, 5) substituted with two oxo groups, or 6) substituted with two (-R<sup>11</sup>)s, or the monocyclic ring and the bicyclic ring are unsubstituted, where R<sup>11</sup> represents any one of a methyl group, an ethyl group, an n-propyl group, an n-butyl group, an n-pentyl group, a 2-propenyl group, a benzyl group, an acetylamino group, a t-butoxycarbonylamino group, a hydroxymethyl group, a 2-hydroxyethyl group, a 3-hydroxypropyl group, a 2-cyanoethoxy group, a (2-cyanoethoxy)methyl group, a 2-carbamoylethoxy group, an ethoxycarbonyl group, a t-butoxycarbonyl group, a benzoyloxy group, a phenylacetylamino group, a butanoylamino group, and a

pentanoylamino group; among  $R^5$ ,  $R^6$ , and  $R^7$ , a group which is not involved in formation of the ring represents a straight chain alkyl group having from 1 to 6 carbon atoms, a straight chain alkenyl group having from 3 to 4 carbon atoms, or a straight chain alkynyl group having 3, 4, or 6 carbon atoms, and 1) the alkyl group, the alkenyl group, and the alkynyl group represented by  $R^5$ ,  $R^6$ , or  $R^7$  are substituted with any one of a phenyl group, a thienyl group, a furyl group, a piperidyl group, a pyrrolidyl group, a morpholyl group, a cyclopropyl group, a cyclopentyl group, a cyano group, a hydroxyl group, a carboxyl group, and an  $-SO_3H$  group, 2) the alkyl group, the alkenyl group, and the alkynyl group are substituted with two hydroxyl groups, 3) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one hydroxyl group and one  $-SO_3H$ , 4) the alkyl group, the alkenyl group, and the alkynyl group are substituted with four hydroxyl groups and one oxo group, 5) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one nitro group and one morpholyl group, 6) one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by a  $-CO_2-$ , or 7) the alkyl group, the alkenyl group, and the alkynyl group are substituted with one morpholyl group and moreover, one of methylenes which constitute the alkyl group, the alkenyl group, and the alkynyl group is replaced by an  $-O-$ , or the alkyl group, the alkenyl group, and the alkynyl group are neither substituted nor replaced,

III)  $N^+R^5R^6R^7$  represents any one of 1) a pyridinium ring substituted with any one of a cyano group, a phenyl group, a thienyl group, a pyridyl group, a methoxy group, an ethoxy group, a propoxy group, a carboxyl group, a  $-CONH_2$  group, and a  $-R^{12}$  group, 2) a pyridinium ring substituted with two cyano groups, 3) a pyridinium ring substituted with two  $(-R^{12})$ s, 4) a pyridinium ring substituted with one cyano group and one  $-R^{12}$ , 5) a pyridinium ring substituted with one phenyl group and one  $-R^{12}$ , 6) a quinolinium ring substituted with any one of a cyano group, a nitro group, a carboxyl group, a methoxy group, an ethoxy group, a propoxy group, and  $-R^{12}$ , 7) a quinolinium ring substituted with one methoxy group and one  $-R^{12}$ , 8) a quinolinium ring substituted with one nitro group and one  $-R^{12}$ , 9) an unsubstituted pyridinium ring, 10) an unsubstituted quinolinium ring, and 11) an unsubstituted isoquinolinium ring, where  $R^{12}$  represents any one of a methyl group, an ethyl group, an n-propyl group, an i-propyl group, an n-butyl group, a t-butyl group, an n-pentyl group, a 3-pentyl group, a 5-nonyl group, a vinyl group, a benzyl group, a 3-phenylpropyl group, a 2-(1-naphthyl)vinyl group, a hydroxymethyl group, a 2-hydroxyethyl group, a 3-hydroxypropyl group, a formyl group, an acetyl group, a propionyl group, a benzoyl group, a methoxycarbonyl group, an ethoxycarbonyl group, a butoxycarbonyl group, a hexoxycarbonyl group, a benzyloxycarbonyl group, a 2-propenyloxycarbonyl group, an ethoxycarbonylmethyl group, a 2-(methoxycarbonyl)ethyl group,

an ethoxycarbonylmethylcarbonyl group, a 2-hydroxyethylaminocarbonyl group, a bis(2-hydroxyethyl)aminocarbonyl group, a 2-carboxyvinyl group, a carboxymethylthio group, a cyanomethyl group, a 2-nitrovinyl group, a 2-(4-pyridyl)ethyl group, a 2-(4-pyridyl)vinyl group, a 3-(4-pyridyl)propyl group, a 2-(4-pyridyl)-1,2-dihydroxyethyl group, and a 2-sulfoethyl group, provided that the position of its bonding with Z is an ammonium nitrogen atom.

47. (new) The compound according to claim 31, wherein  $N^+R^5R^6R^7$  is any one of I), II), and III) given below which are mutually independent:

I)  $R^5$ ,  $R^6$ , and  $R^7$ , which may be mutually different, each represents any one of a straight chain alkyl group having from 1 to 10 carbon atoms, a straight chain alkyl group having from 1 to 10 carbon atoms which is substituted with one phenyl group, a straight chain alkyl group having from 1 to 10 carbon atoms which is substituted with one hydroxyl group, a straight chain alkenyl group having from 3 to 6, or 8 carbon atoms, a branched alkenyl group having 4, 6, or 7 carbon atoms, a straight chain alkynyl group having 3, 5, 6, 7, or 9 carbon atoms, and a branched alkynyl group having 6 carbon atoms,

II)  $N^+R^5R^6R^7$  represents a pyrrolidinium ring, a piperidinium ring, an azepanium ring, a quinuclidinium ring, or a 1,4-diazabicyclo[2.2.2]-octanium ring, substituted with any one of a methyl group, an ethyl group, an n-propyl group, an n-butyl



group, an n-pentyl group, a 2-propenyl group, a phenyl group, a benzyl group, a hydroxyl group, a hydroxymethyl group, a 2-hydroxyethyl group, and a 3-hydroxypropyl group, or unsubstituted, provided that the position of its bonding with Z is an ammonium nitrogen atom; among  $R^5$ ,  $R^6$ , and  $R^7$ , a group which is not involved in formation of the ring represents any one of a straight chain alkyl group having from 1 to 6 carbon atoms, a straight chain alkyl group having from 1 to 6 carbon atoms which is substituted with one phenyl group, a straight chain alkyl group having from 1 to 6 carbon atoms which is substituted with one hydroxyl group, a straight chain alkenyl group having from 3 to 4 carbon atoms, and a straight chain alkynyl group having 3, 4, or 6 carbon atoms,

III)  $N^+R^5R^6R^7$  represents an unsubstituted pyridinium ring, an unsubstituted quinolinium ring, an unsubstituted isoquinolinium ring, a pyridinium ring substituted with any one of a methyl group, an ethyl group, an n-propyl group, an i-propyl group, an n-butyl group, a t-butyl group, an n-pentyl group, a vinyl group, a phenyl group, a benzyl group, a 3-phenylpropyl group, a hydroxymethyl group, a 2-hydroxyethyl group, and a 3-hydroxypropyl group, a pyridinium ring substituted with any one selected from two methyl groups or two ethyl groups, a pyridinium ring substituted with one phenyl group and one methyl group, or a quinolinium ring substituted with any one of a methyl group and an i-propyl group, provided that the position of its bonding with

Z is ammonium nitrogen atom.

48. (new) The compound according to claim 45, wherein  $R^1$  and  $R^2$ , which may be mutually different, each represents a straight chain alkyl group having 2 to 6 carbon atoms, and  $(NR^3R^4)_m$  represents any one of a dimethylamino group substituting at the 7-position, a diethylamino group substituting at the 7-position, an ethylmethylanino group substituting at the 7-position, a dimethylamino group substituting at the 9-position, and dimethylamino groups substituting at the 7- and 9-positions.

49. (new) The compound according to claim 46, wherein  $R^1$  and  $R^2$ , which may be mutually different, each represents a straight chain alkyl group having 2 to 6 carbon atoms, and  $(NR^3R^4)_m$  represents any one of a dimethylamino group substituting at the 7-position, a diethylamino group substituting at the 7-position, an ethylmethylanino group substituting at the 7-position, a dimethylamino group substituting at the 9-position, and dimethylamino groups substituting at the 7- and 9-positions.

50. (new) The compound according to claim 47, wherein  $R^1$  and  $R^2$ , which may be mutually different, each represents a straight chain alkyl group having 2 to 6 carbon atoms, and  $(NR^3R^4)_m$  represents any one of a dimethylamino group substituting at the 7-position, a diethylamino group substituting at the 7-position, an ethylmethylanino group substituting at the 7-position, a dimethylamino group substituting at the 9-position, and dimethylamino groups substituting at the 7- and 9-positions.

51. (new) The compound according to claim 48, wherein  $(NR^3R^4)_m$  represents any one of a dimethylamino group substituting at the 7-position, a diethylamino group substituting at the 7-position, and an ethylmethylanino group substituting at the 7-position, and  $N^+R^5R^6R^7$  represents any one of a 4-t-butylpyridinium group, a 3-(3-hydroxypropyl)-pyridinium group, a 3-[2-(methoxycarbonyl)ethyl]-pyridinium group, a 2-(n-propyl)-pyridinium group, a 4-phenylquinuclidinium group, and a 1,4-diazabicyclo[2.2.2]octanium group.

52. (new) A pharmaceutical composition containing the compound according to claim 31 as an active ingredient.